REPORT OF A COMMITTEE

OF THE

CHAMBER OF COMMERCE

OF

NEW-YORK,

ON

CANAL NAVIGATION BY STEAM.

December, 1858.

New-York:

JOHN W. AMERMAN, PRINTER,

No. 47 CEDAR-STREET.

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STEAM UPON THE CANALS.

Chamber of Commerce.

New-York, December 2, 1858.

THE committee appointed at the 4th of November meeting, to inquire into the feasibility and benefit of navigating the Erie and other canals of this State by the use of steam, beg leave to

REPORT:

That since presenting, at the meeting of 11th ult., the result of their partial inquiries, they have further prosecuted their investigations, and are more fully than ever convinced of the useful agency of steam in the propelling of boats upon our canals.

Your committee confidently reiterate all the points that were touched in their brief opening report, a copy of which is annexed.

Leaving the mechanical specifications to the discretion and intelligence of practical engineers, your committee will simply declare their conviction, that the most desirable qualities, namely, economy in space and weight, as well as economy in fuel, can be attained in many of the engines and boilers that have been brought before the public, since the agitation of this subject. It can be most confidently affirmed, after full inquiry and trial, that the banks of the canals will not be injured by propelling boats with steam.

There are none of the recent experiences upon any of the American or European canals that justify any such fears.

Instances can be cited of a speed upon canals in Europe equal to ten miles an hour, without damage to the banks of their canals, so that, in short, not a particle of doubt remains as to the ability to secure all the economy and speed spoken of in the accompanying papers.

Although the specific duty of the committee was to report as to the use of steam in navigating our canals, they regard it as relevant to the subject to speak of the commercial influences connected with the transportation of produce and merchandise by steam in that way.

As, however, the limits of what can be presented at one of the brief business meetings of the Chamber, do not permit of so full and detailed a discussion as the importance of the topic demands, your committee will only speak in general terms of the pre-eminent value of our canals in the promotion of all the leading interests of our city and State, and refer to the papers hereto appended, for a more full exemplification of the weighty considerations which should induce us at once to concentrate our best energies to completing the enlargement of our canals. The deepening of the water must be completed to the full extent of what has for years been proposed, before we can reap the full benefit of the new agency now contemplated.

The committee deem it well to refrain from any special suggestions as to what portions of the canals of New-York should receive the first attention. That branch of the subject will naturally be governed by circumstances which can be better understood and appreciated by competent engineers, through legislative committees of investigation.

The impression is entertained in the minds of some, that any essential increase in the use of our canals, may lessen the profits of our rail-roads. Your committee cannot see any just cause for such opinion; on the contrary, they are confident in the belief that the rail-roads near our canals will be benefited by improvements in the general features of trade that will ensue from the increased ability of the canals. The latter will take a great deal of cheap and bulky merchandise, that the rail-roads gain nothing now by carrying. The rail-roads will continue to take valuable articles, the rapid transmission of which is more essential. They will also take such goods as are of great value in proportion to their bulk. And then, too, the rapid extension of trade and commerce, that the doubling the ability of our canals will pour into the city of New-York, will increase the number of travellers by rail-road far beyond all present computation, and in this will consist the main profits of rail-roads. So that, as is well said in one of our supplementary papers, there need be no improper nor unprofitable rivalry between the two modes of conveyance.

The accompanying two papers, marked B. and C., among other matters, speak of the great activity of our Canadian neighbors in the work of perfecting their canals.

We cannot feel surprised, nor can we complain of these rival measures;

on the contrary, these causes of friendly emulation are useful, for they awaken energies that are generally conducive to good results. Pursuant to this, their legitimate influence, it is to be hoped that our great commercial emporium of the nation may promptly act *their* part in the advancing tendencies of the age.

C. BARSTOW,
W. S. GRIFFITH,
G. W. BLUNT,
J. L. POPE,
F. A. CONKLING,
W. E. DODGE,
} *Committee.*

Resolved, That the Chamber adopt the foregoing report, and that the committee be instructed to prepare a memorial to the legislature, urging upon them the importance of completing, at as early a day as possible, the enlargement of the canals of this state.

REPORT

OF THE COMMITTEE UPON NAVIGATING OUR CANALS WITH STEAM.

At the meeting of the Chamber of Commerce, held 11th November, 1858, Mr. Caleb Barstow presented the following report from the Committee on Canal Steam Navigation:

Chamber of Commerce, New-York, Nov. 11.

The committee appointed at the meeting of 4th inst., to visit the steam canal boat Samuel B. Ruggles, and to inquire as to the practicability and benefit of navigating the Erie and other principal canals of this State by the use of steam, beg leave to report:

That they have not yet had full opportunity to bestow all the thought and care that the importance of the subject demands. They will, therefore, ask from the Chamber the liberty to reserve for a future occasion a more full discussion of the various points connected with the subject.

Your committee will merely, upon the present occasion, say, in general terms, that their visit to the very superior canal boat Samuel B. Ruggles, named for one of our energetic and intelligent Canal Commissioners, and inquiry into all her equipments and qualities, both as to mechanical construction of the vessel and arrangements of her steam appurtenances, justify the fullest conviction that our great Erie Canal, as well as the Oswego and other canals, can be more advantageously navigated by steam, especially so after the canals have been fully enlarged.

The completion of the great work of enlarging the canals of our State, and the simultaneous introduction of steam as the motive power of their navigation, will mark an era of eventful interest to our country, but especially to this City and State.

The New-York canals will then be the cheapest channels for the transportation of merchandise and produce between the sea-board cities and the whole great West that exists, or that probably can ever exist.

The two points to be gained are speed and cheapness of transportation.

First, Speed.—The present average time for a loaded canal boat between this city and Buffalo is eleven days. The average time for the transmission of freight between these cities by rail-road is five days.

The difference of six days in time turns a large amount of freight to the rail-road, which would otherwise take the cheaper mode of conveyance afforded by the canal.

In order that the vast and greatly increasing quantities of merchandise coming down through our State may enjoy all the benefits of a cheaper transit, your committee would here suggest the great benefit of overcoming or essentially lessening this great difference of time that exists now between the rail and the canal. Your committee are confident in the opinion, that this difference can be so far lessened as to render it unimportant.

If a canal steamboat, having one barge, can make the passage in seven days, as can easily be done, the difference would thus be reduced to two days, which, as respects nine-tenths of the amount of the tonnage that now seeks the rail, is unimportant, and would secure that business to the canal.

Second, Cost of Transportation.—Here the enlargement of the canal and the use of steam must produce great results. The saving of propelling a ton of freight from Buffalo to New-York by the use of steam, if the data we have can be relied on, will be 50 cents per ton as compared with the cost of propelling it by horse power, as at present in use. A steam canal boat can carry on the enlarged canal 200 tons of freight, and at the same time can tow another boat with 250 tons—thus bringing through at one passage, 450 tons in seven days, at an expense for fuel, wages and labor, of $250, or about 52 cents per ton. If we add 48 cents per ton for use of property, repairs and agency, the actual cost of transporting a ton of property will be only $1, exclusive of tolls.

This must, of course, put all competition at defiance.

In the prosecution of these inquiries, the attention of your committee has been given to some of the adjustments of the different engines and their appurtenances, that are likely to be used on the canals. The true and legitimate aim would seem to be to seek for the greatest degree of power in the smallest space and lightest weight. These are very important considerations in the propelling of boats where the depth of water is so important as it is on a canal.

The boat S. B. Ruggles is propelled by a double reciprocating engine, and return flue boiler. They are spoken well of by her engineer, but they occupy rather more space, and have, perhaps, somewhat more

weight of metal than will be used, as the enterprise is progressed in by further trial. The boat under consideration is very superior in all respects, but is probably constructed in a more expensive manner than will be indispensably needed in future boats.

These points are referred to as an intimation that greater economy can be attained when the inevitable rivalry of trade may seem to demand it.

The wholesome rivalry that will undoubtedly spring up in the carrying trade upon our canals, will bring to light a succession of improvements in all the propelling powers of steam, as well as in the modelling and construction of boats.

Your committee would most emphatically urge the great importance of deepening the water to seven feet for the whole length of the Erie and other canals; also, to complete their enlargement at as early a day as possible. To this end, your committee would recommend to the Chamber of Commerce to memorialize the Legislature at the first opening of the approaching session.

When all these measures are consummated, the benefits that will accrue to our city will be almost incalculable. Upon this branch of the subject, with kindred topics, and a discussion of the influence we shall exert upon the various modes of conveyance throughout the United States, your committee beg leave to reserve for a further report, to be submitted at the regular meeting of the Chamber for December, at which time they will report resolutions, with a memorial to our Legislature.

C. BARSTOW,
W. S. GRIFFITH,
G. W. BLUNT,
J. L. POPE,
} *Committee.*

Messrs. F. A. CONKLING and W. E. DODGE were added to the committee.

B.

F. A. CONKLING, Esq., moved the acceptance of the original Report, and spoke as follows:

Mr. President and Gentlemen:

We are met to commemorate a new era in the history of the Erie Canal, and consequently in the prosperity of our city. The supremacy of New-York over all the other cities on this continent, in numbers, wealth and the extent of its commerce, dates from the opening of this work, which turned the commerce of the interior from its natural channels, having their outlets far distant from us, into our own capacious and magnificent harbor.

Before the completion of this great avenue of trade and travel, New-York was the second city in the Union in population, dignity, and the extent of its inland commerce. The excellence of our harbor caused it to be much used by our neighbors, who, with better means of communication with the interior, commanded by far the greater part of its trade. That of New-York was for the most part confined to the area drained by the rivers falling into its bay. The cost of transporting a ton of merchandise from New-York to Buffalo, so late as 1817, was one hundred dollars, and the time required twenty days. At that date, the population of this city had scarcely reached one hundred thousand souls. The gross amount of our foreign exports and imports in 1820 was only $37,789,523.

Our foreign commerce received an instant impulse from the opening of the Erie Canal. To show how nearly the progress of the commerce on the canal has been allied with that of this city, and that the latter is in a great degree the result of the former, I have prepared a table of the amount and value of tonnage received through it at tide water, in the years 1825 and 1857 respectively, and of the progress of the city, during the intervening period, in population, wealth and amount of exports and imports:

	1825.	1857.
No. of tons received by Canal at tide water,.....	185,405	1,217,199
Value of do.,.....	$18,540,000	$136,977,000
Population of New-York city and Brooklyn,.....	175,100	1,000,000
Valuation of Real and Personal property in New-York City and Brooklyn,.....	$106,000,000	$620,000,000
Value of Foreign Exports and Imports of New-York City,.....	$84,057,000	$346,939,000

But results so marvellous, and a supremacy so imposing, flowing mainly from the construction of this work, could not long exist without efforts being made by some to regain what they had lost, and by others to divide with us the advantages which we possessed. On the north, with this double object, the grand water line of the St. Lawrence has been made navigable for large class vessels, from the head of Lake Superior to the straits of Belle Isle—a distance of more than 2,500 miles. These straits front the markets of the Old World, which, for the present, are the markets of the New. We have here a competitor raised up, possessing vastly greater capacity than our own work, in the hands of a rival nation, animated by the two-fold purpose to make their magnificent improvement profitable, and, by diverting the trade we now enjoy, to aggrandize themselves at our expense. The St. Lawrence canals pass vessels of (500) five hundred tons burden—more than twice as large as the Erie Canal will admit with its enlarged prism. The tolls upon them have been imposed rather with a view to encourage traffic than to raise a revenue. Their success has been most extraordinary. The following statement will show the increase in the amount of tonnage which has passed over them for a series of years:

Welland Canal.		St. Lawrence Canals.	
Year.	*Tons.*	*Year.*	*Tons.*
1848	307,611	1848	164,267
1849	351,596	1849	213,153
1850	399,600	1850	288,103
1851	691,627	1851	450,400
1852	743,060	1852	492,575
1853	905,518	1853	561,601
1854	797,210	1854	662,613
1855	849,333	1855	541,254
1856	976,556	1856	634,536
1857	901,072	1857	593,652

The competition of the Canadian canals may be regarded as just commenced. Every few weeks we see the arrival of vessels announced at the ports of Liverpool and London, direct from Chicago and Detroit. Events of recent occurrence prove it to be the intention of the British people to establish themselves firmly on this continent, and either to constitute their provinces into a vice-royalty, or to consolidate them into one confederacy under the protection of the home government. The discovery of gold on Fraser River, and the known value of the British Possessions on the Pacific, as well as in the interior of the continent, have created a belief that another nation may be raised up on this conti-

nent approaching the United States in the extent and value of its territory, in population and in power. Such a commonwealth, it is thought, would be in close sympathy with the mother country, and would prove its sure ally in checking what the British people regard as our threatening and aggressive policy. They now propose to carry a line of population and public works directly across the continent, which shall be entirely independent of any connection with our own. Already have the improvements on the rivers St. Lawrence and Niagara extended such a line more than half way to the Pacific. Though necessity may for a time compel the use of the common highway of the St. Lawrence, a railway, commencing at Halifax, is to be constructed, running north of Lake Superior, through the valley of the Saskatchawan, to their possessions west of the Rocky Mountains. There can be no doubt that vigorous efforts will be used to carry out this grand project. They propose still further to improve their great water-line, and to withdraw it to a still greater distance from our frontier, by constructing a canal from Toronto to Georgian Bay, the eastern prolongation of Lake Huron. Further to the east they are busily occupied with the project of a railway from Halifax to Quebec, for the purpose of reaching a winter harbor of their own, thereby avoiding us altogether. As they are impelled by political, as well as commercial considerations, they will doubtless concentrate their energies upon the works described. We can successfully combat their influence only by making it more for the interest of every portion of the interior to seek our market, by offering a cheaper rate of carriage and better prices for whatever it produces.

But we have an equally resolute competition in other quarters. Before the use of rail-roads we had obtained a comparative monopoly of the inland trade of the country, because we possessed the best artificial means of communication by which it could be reached. Our rivals on the south had attempted similar works, but their efforts had proved only partially successful on account of the physical obstacles encountered. The railway came to their aid, and enabled them to cross the mountain ranges which separated them from the great interior basin of the country, and to dispute, upon nearly equal terms, our claim to its trade. The proximity of the cities of Philadelphia and Baltimore to the Ohio river gives them, as is well known, certain advantages over New-York. These advantages we can overcome only by falling back upon the Erie Canal, and *by enlarging its capacity and cheapening the means of transportation over it*, rendering it as much superior to any of the competing works constructed to divert its trade, as it was originally superior to the

ordinary highway. This is the problem now to be solved. If successful in this, we shall confirm to our city, beyond peradventure, the supremacy which we have already reached, and which bids fair to make New-York the commercial mistress of the world.

The following tables will serve to show, in some measure, the magnitude of the prize for which we have to contend:

Superficial Area of the Northwestern States and Territories.

States, etc.	Superficies.
Ohio,	39,964 square miles.
Indiana,	33,809 "
Michigan,	56,243 "
Illinois,	55,405 "
Wisconsin,	53,924 "
Missouri,	67,380 "
Iowa,	50,914 "
Minnesota,	75,464 "
Dacotah Territory, (not organized,)	90,561 "
Nebraska Territory,	335,882 "
Kansas Territory,	174,798 "
Total area,	974,344 "

Population of this area in 1820, 1830, 1840, 1850 *and* 1858, *and the Average Population to the square mile at each of these periods.*

	Absolute Population.				
States and Territories.	1820.	1830.	1840.	1850.	1858.
Ohio,	581,434	937,903	1,519,467	1,977,031	*2,450,000
Indiana,	147,178	343,031	685,866	988,734	*1,300,000
Michigan,	8,896	31,639	212,267	397,654	*650,000
Illinois,	55,211	157,455	476,183	851,298	*1,550,000
Wisconsin,	....	....	30,945	304,226	*650,000
Missouri,	66,586	140,445	383,702	682,043	*1,000,000
Iowa,	....	....	43,112	192,214	*600,000
Minnesota,	....	....	....	6,000	†153,000
Dacotah Ter.,	....	....	....	....	*5,000
Nebraska Ter.,	....	....	....	....	*20,000
Kansas Ter.,	....	....	....	....	*75,000
Totals,	859,385	1,910,473	3,321,542	5,397,200	8,453,000

Increase of population from	1820 to 1830,		1,051,088
Do.	do.	1830 to 1840,	1,411,069
Do.	do.	1840 to 1850,	2,075,658
Do.	do.	1850 to 1858,	3,055,800
Increase in thirty-eight years,			7,593,615
Per centage of increase in thirty-eight years,			883

* Estimated. † Official.

AVERAGE POPULATION TO THE SQUARE MILE.

States and Territories.	1820.	1830.	1840.	1850.	1858.
Ohio,	14.5	23.4	38.	49.4	61.3
Indiana,	4.3	10.5	20.2	29.2	38.4
Michigan,	0.15	0.56	3.7	7.	9.
Illinois,	1.	2.9	8.	15.	27.9
Wisconsin,	0.	0.	0.056	5.6	12.
Missouri,	1.	2.1	5.9	10.5	15.3
Iowa,	0.	0.	0.84	3.7	11.7
Minnesota,	0.	0.	0.	0.08	2.
Dacotah Ter.,	0.	0.	0.	0.	0.055
Nebraska Ter.,	0.	0.	0.	0.	0.059
Kansas Ter.,	0.	0.	0.	0.	0.65

Average population of whole area to square mile,				1820,	.088
Do.	do.	do.	do.	1830,	1.9
Do.	do.	do.	do.	1840,	3.4
Do.	do.	do.	do.	1850,	5.53
Do.	do.	do.	do.	1858,	8.67

Taxable Property, Real and Personal, in the several States named.

STATES.	1840.	1850.	1855.	1858.
Ohio,	$128,353,657	$439,966,340	$837,425,743	$860,877,354
Indiana,	107,037,317	152,870,399	290,418,148	301,858,474
Michigan,	37,833,024	29,384,270	120,362,474	137,663,009
Illinois,	*74,284,000	114,782,645	333,287,174	407,477,367
Wisconsin,	*5,580,000	26,715,525	72,912,318	87,512,917
Missouri,	*55,296,000	97,595,463	223,948,221	268,789,211
Iowa,	*6,708,000	22,623,334	116,895,390	210,944,583
Minnesota,	....	1,182,060	9,031,157	23,347,701
Total,	$415,091,998	$885,120,036	$2,004,280,625	$2,298,470,616
Add for Kansas, Nebraska and Dacotah, estimated,				25,000,000
Making an aggregate valuation of				$2,323,470,616

Increase from	1840 to 1850,	$470,028,038
do.	1850 to 1855,	1,119,160,589
do.	1855 to 1858,	319,189,991

Taxable Property, Real and Personal, in the Eastern and Middle States.

	1850.	1855.	1858.
Eastern States,	$1,012,985,902	$1,214,356,926	$1,374,340,682
Middle States,	1,593,256,934	2,788,344,883	2,933,526,584

* Estimated.

Superficial Area and Population to the Square Mile in the Eastern and Middle States, and in France, Great Britain and Belgium.

1.—Superficial Area.

Eastern States, (incl. Me., N. H., Vt., Mass., R. I. and Ct.,)	65,038	sq. miles.
Middle States, (incl. N. Y., N. J., Pa., Del. and Md.,)	114,564	"
France, (incl. Corsica,)	207,149	"
Great Britain, (excl. of Ireland,)	89,644	"
Belgium,	11,402	"

2.—Absolute Population.

	1840.	1845.	1850.	1855.
Eastern States,	2,234,822	2,492,986	2,728,116	3,000,921
Middle States,	5,074,364	5,822,337	6,624,988	7,315,546
France,	34,230,178	34,921,333	35,781,628	36,039,364
Great Britain,	18,529,316	19,581,723	20,816,351	22,080,399
Belgium,	4,073,162	4,209,984	4,359,932	4,530,228

3.—Average Population to the Square Mile.

	1840.	1845.	1850.	1855.
Eastern States,	34.4	38.3	41.9	45.4
Middle States,	44.3	50.8	57.9	63.9
France,	165.2	168.6	172.7	173.9
Great Britain,	206.8	218.2	232.2	246.3
Belgium,	357.2	369.2	382.4	397.3

The following table shows what the population of our Northwestern States and Territories will be when its density shall reach that of the Districts and Countries named above:

Same density with Eastern States,		44,255,218
Do.	do. Middle States,	62,260,582
Do.	do. France,	162,338,422
Do.	do. Great Britain,	239,980,927
Do.	do. Belgium,	386,396,871

One great instrument in securing the supremacy of which I have spoken is that which has been discussed in the report to which we have just listened. While the motive power of all rival lines is *steam*, we can no longer afford to use that of *muscle* upon our great work. The substitution of the former for the latter marks the line of demarcation between the past and future civilizations. Only a few short years ago *muscular power*, either of man or animals, was that chiefly employed in production and in internal commerce. Where steam can be used, it multiplies the power of man ten thousand fold. That the immense amount of merchandise annually carried between Albany and Buffalo should continue to be moved by *horses*, almost exceeds belief.

But there is a moral as well as an economical aspect of this improved means of transportation. Every process that abridges labor is always

beneficent, as it secures a larger return to the laborer, who, by a necessary law, rises in the scale of comfort, intelligence, virtue and self-respect with his increased means. Civilized society commences only with the acquisition and establishment of property. Neither the virtues nor the amenities of civilized life can exist without an abundance of good food and good clothing. When these are wanting, there can be neither moral elevation nor strength. In this view the canal has been a great civilizer, as it has supplied so bountifully the means of comfort and improvement. The substitution of steam will not only greatly increase its usefulness, but it is to produce a more direct and palpable good. At the present time, the drivers and boatmen employed on the canal, like the sailor, cut off from those associations and influences which supply the needful gratification to his tastes and desires, and shield him from vice, too frequently become dissipated, improvident and degraded, with no higher aim or source of enjoyment than the gratification of their passions. Substitute the labor of a machine for their own, and you not only increase their self-respect, and elevate them in the social scale, but you render necessary a higher degree of intelligence on their part to direct the agency which has supplanted their rude toil. The laborer on the canal is no longer a mere drudge. He has a consciousness of disenthralment, of responsibilities, of a capacity for further elevation and progress. No one who has crossed the ocean in both steam and sailing ships, can have failed to be struck with the great superiority in bearing and intelligence of the sailors on board the former over those on board the latter. The reason is obvious: the sailor on the steamship is not the lowest agency employed. The power which moves the steamer, to which he ministers, and which he controls, is exerted as much for him as for the master. So it will be on the canal. It will give a home to every person employed in navigating it—a home where all the rules that govern a well-regulated establishment can be enforced—such as regular hours, correct habits and orderly deportment, with considerably increased means for mental improvement. A large class of laborers on the canal are now beyond the reach of benevolent effort, no matter how disinterested or untiring. This class can be reached only through the physical agencies which underlie all moral ones.

Before many years shall elapse, the use of horses on the Erie Canal will be as uncommon as their use for the purposes of trade and travel between New-York and Albany. As upon the Hudson river, so upon the canal, the steam-tug will take in its train a flotilla of boats, whereby the length of time now required for the trip, as well as the cost for transportation, will be reduced one-half. This diminution in the duration of

the trip must of course have the effect, up to a certain point, correspondingly to augment the capacity of the canal, in other words, to double it. When this shall be accomplished, and the cost of transportation between Albany and Buffalo reduced to $1 per ton, as predicted in the report of the committee, or even to $2 per ton, which is equivalent to 20 cents per barrel of flour, the canal will be restored to the position it once occupied: and it must enjoy for the future, by reason of the greater cheapness of transportation compared with any other route, an undisputed monopoly of the commerce of those portions of the interior previously commanded by us; while the area of our trade will be enlarged just in proportion to the saving to be effected.

It would be interesting to show how regularly the area of our trade becomes extended with the reduced cost of movement on our great commercial artery. A reduction equal to one cent per ton removes perceptibly from us the dividing line which turns the trade of the interior to other cities. The use of steam on the enlarged canal, as has been already remarked, will reduce the cost of transportation over it from Buffalo to Albany at least $2 per ton—or, as before stated, 20 cents per barrel of flour. At this rate flour can be transported over rail-roads 100 miles. Such a rate of reduction will therefore extend the radius which describes the present circle of our trade to an equal distance, enlarging its area more than 100,000 square miles, and embracing the most fertile portion of our territory, already the seat of several millions of inhabitants. At present, the salt manufactured on the Kanawha, in Virginia, meets the product of our own *salines* at Terre Haute, in Indiana, and is supplied to the entire region south of that point. Reduce the price of the Onondaga salt to the western consumer, by diminishing the cost of transporting it to his door, and you drive competition to a greater distance from us, thus opening new markets of almost incalculable extent. Such are some of the results that are to follow the enlargement of the canal, and the substitution upon it of steam for animal power.

But this is not all. With the valley of the Mississippi and St. Lawrence rivers, we have been accustomed to regard the area of the northern and central portions of our continent available for agriculture as exhausted. We limited our vision to the ground we stood upon. But no sooner have we filled up one grand division, than another opens before us. There is, in the heart of North America, a distinct subdivision, of which Lake Winnepeg may be regarded as the centre. This subdivision, like the valley of the Mississippi, is distinguished for the fertility of its soil and for the extent and gentle slope of its great plains, watered by rivers of great extent, and admirably adapted for steam navigation.

It has a climate not exceeding in severity that of many portions of Canada and the Eastern States. It will, in all respects, compare favorably with some of the most densely peopled portions of the continent of Europe. In other words, it is admirably fitted to become the seat of a numerous, hardy and prosperous community. It has an area equal to eight or ten of our first-class states. Its great river, the Saskatchawan, carries a navigable water line to the very base of the Rocky Mountains. It is not at all improbable that the valley of this river may yet offer the best route for a rail-road to the Pacific. The navigable waters of this great subdivision interlock with those of the Mississippi. The Red River of the north, in connection with Lake Winnipeg, into which it falls, forms a navigable water line extending directly north and south nearly 800 miles. The Red River is one of the best adapted to the use of steam in the world, having from twelve to fifteen feet of water for nearly its entire course, some 450 miles. It waters one of the finest prairie regions on the continent. Between the highest point at which it is navigable and St. Paul, the head of navigation on the Mississippi, a rail-road is in process of construction, 60 miles of which will be completed the coming year. The entire distance to be built is only 200 miles. When this road shall be completed, another grand division of the continent, comprising half a million square miles, will, as before stated, be open to settlement, in which communities will spring up with the rapidity which has marked the marvellous growth of our own country, possessing all the elements of prosperity, and of an extensive commerce. This commerce will be added to that we now receive from the Great West, if we welcome it with such facilities as will enable the grains and meats of the eastern slope of the Rocky Mountains, and the north shore of Lake Winnipeg, to be set down upon our docks at rates which will yield a good return to the producer, though transported more than 2,000 miles. No continent can show a parallel, as none can show such stupendous works for the facilitation of commerce by a people "in the gristle, and not yet ripened into the bone, of manhood."

Intimately connected with this subject of reducing the cost of transportation upon the canal, is another which has created much discussion and a wide diversity of opinion—the proposition to re-impose canal tolls upon the merchandise carried by competing lines of rail-road. I am opposed to such a step both as impolitic and unnecessary. If necessary, in order to retain trade on the canals, it would be impolitic, as it would defeat the very object for which the canals were constructed, viz., *to*

cheapen transportation. Just to the extent to which it can be cheapened is the saving, either to the producer or consumer. The cost of transportation is a public *tax;* and all taxes should be laid in such a manner as to create the least amount of oppression or disturbance to the processes of industry. To accomplish such an end, taxes should never be laid on *processes*, but on their results. The cost of a boat load of lumber at the place of its production may not be more than $500, which, when worked up into articles of luxury or use, may be worth $50,000. A tax upon the latter of one per cent., which could well be borne, would be equal to the entire value of the raw material. A tax equal to the cost of transportation upon the process of manufacture would defeat it altogether, and deprive hundreds, perhaps, of employment and support.

We should be careful to remove every burden in our power from the commerce that seeks our city. We gain absolutely by the saving effected, and relatively by attracting to ourselves what, with a heavy burden imposed, would be driven off to cheaper routes, and to cities adopting a more liberal policy. We can never afford to use a process of any kind because it has cost us money, after a better one shall have been discovered. Correctly viewed, it would be a matter of congratulation, were the rail-road to supersede the canal, as it would prove that we had found a better way. So if the rail-road could be superseded, we should not hesitate to throw it aside, no matter at what cost. We can safely stand on no other ground. We must place the rail-road and the canal on the same terms, by allowing each to carry as cheaply as possible, and let the strongest win the prize.

But there is really no just ground for rivalry between the two. Each has its appropriate functions, in the exercise of which each assists the other. There are certain articles, the value of which mainly depends upon the rapidity of their transmission—such as live stock and all the more perishable kinds of food. Another kind of freight appropriate to a rail-road is such as possesses great value in proportion to its bulk. The rail-road, by the facilities it affords for travel and the transmission of the mails, is instrumental in filling up the interior with people whose industry in turn creates business for the canal. The articles of freight especially belonging to the latter are the various kinds of grain, lumber, salt, iron, cured provisions, etc., etc. The loss ensuing from delay in their transportation is chiefly measured by the interest on their value. Such articles must always constitute a large proportion of the traffic on every great route of commerce, and of such the canal will

have a monopoly, by virtue of its greater facilities and cheaper transportation.

The present occasion, in my judgment, should not be allowed to pass without a proper tribute to E. S. Prosser, Esq., of Buffalo, the appearance of whose steamer at our wharves, direct from Lake Erie, freighted with the produce of the West, is one of the reasons for assembling here to-day.

C.

[*From the N. Y. Courier and Enquirer of 26th November.*]

THE CANAL SYSTEM.

The workings of our canal system claim the earnest consideration of our legislators and merchants. The interests of the whole commercial and manufacturing community are deeply concerned in the success of this system in which the State has invested many millions of dollars. There is now a well-grounded belief that an important revolution is about to take place, whereby permanently beneficial results will follow to the State at large. We are not aware, at this moment, of any subject that is proposed for the consideration of the approaching legislative session which possesses greater importance than the canal system. Our people have for years been convinced of the advantage of enlarging the canals. This will appear more desirable now that we have evidences of an approaching revolution in the propelling power for canal boats.

In our paper of last week we alluded to the experiments that had been made some twenty-five years ago by scientific persons to test the utmost speed that could be safely attained for steam navigation on the canals. While we have been over thirty years maturing our system, our Canadian neighbors have put their own in active operation, with superior capacity to that of the State of New-York. They have borrowed capital to accomplish these works, at four per cent. per annum, while New-York has been, and now is, compelled to pay six per cent.

We now propose to show that our Canadian neighbors have, with admirable foresight, accomplished a line of artificial navigation so as to give a course of nearly 2,500 miles for small steamers or propellers. The capacity of the American lakes for internal navigation is shown in the following table, showing the length and breadth in miles, the depth of each in feet, the elevation of each above the sea level, and the area of each in square miles:

AMERICAN LAKES.

	Length, miles.	*Breadth, miles.*	*Depth, feet.*	*Elevation over sea.*	*Area, sq. miles.*
Superior,	420	120	600	600	32,100
Michigan,	320	70	1,000	573	21,900
Huron,	270	145	350	578	18,750
St. Clair,	25	18	20	570	300
Erie,	250	45	70	564	9,300
Ontario,	190	40	500	234	7,300
St. Lawrence River,	700	..	..	..	....

The Canadian Government has completed five canals, with a uniform depth of ten feet; locks 200 by 45 feet, viz.:

CANADIAN CANALS.

	Length in Miles.	*Depth.*	*Size of Locks.*	*Lockage.*	*No. Locks.*
Lachine,	8½	10	200 x 45	44½	5
Beauharnois,	11¼	10	200 x 45	82½	9
Cornwall,	11½	10	200 x 55	48	7
Farrand's Point,	9¾	10	200 x 45	4	1
Rapid Plat,		10	200 x 45	11½	2
Point Iroquois,		10	200 x 45	6	1
Galops,		10	200 x 45	8	2
Welland,	28	10	150 x 26½	330	27

By means, therefore, of these internal improvements of Canada, vessels drawing ten feet can be taken from Fond du Lac, on Lake Superior, to the Gulf of St. Lawrence, a distance of twenty-two hundred miles. The Erie Canal will, after the proposed enlargement, admit vessels drawing only seven feet, or about two-thirds of the capability of draught on the Canadian canals. And now that the employment of steam on the canals is no longer an experiment, this difference of capacity for draught is the more important. The present minimum depth of the Erie Canal is four and three-quarters feet, and is a sufficient reason to account for the decrease in the canal revenue since 1852. The smallness of the locks is another disadvantage. The smallest locks on the Erie and Welland Canals are as follows:

	Length.	*Width.*
Erie Canal,	100	17½
Welland Canal,	150	26½

To show the growth of our lake trade, and to give some idea of its future, when the rate of increase is accelerated by the use of steam and the necessity for improvements, we give the following figures: During the past fifteen years the trade of the lakes has grown from $65,000,000, in 1841, to $608,310,000, in 1856, or to more than double the entire

foreign commerce of the country. The whole of this aggregate, with the exception of $42,260,000, came through the following ports:

Buffalo,	$303,023,000	Milwaukie,	$35,000,000
Chicago,	223,898,000	Maumee,	94,107,000
Cleveland,	162,185,000	Sandusky,	59,966,000
Detroit,	140,000,000	Oswego,	146,235,000

The tonnage entered and cleared at the lake ports in 1856, was:

	ENTERED.		CLEARED.	
	Steam.	*Sail.*	*Steam.*	*Sail.*
American,	1,434,779	464,822	1,482,548	438,862
Foreign,	397,587	174,619	398,702	166,010
Total,	1,832,366	639,441	1,881,250	604,872

These figures are better than arguments to show the importance of our canal interests. It has been feared that the introduction of steam and a higher rate of speed on the canals would partially destroy the banks and otherwise injure the canals. This opinion is, we think, erroneous. The speed in Great Britain on canals is much greater than it is desirable to use even with steam in this country. Mr. Thomas Grahame, C. E., in his "Letter to Canal Proprietors and Traders," says: "The experiments of great velocity has been tried and proved on the narrowest, shallowest and most curved canals in Scotland, viz., the Ardrossan or Paisley Canal, and the results have disproved the previous theory of injury to banks from vessels moving with a great velocity." He also states, that "the *ordinary speed* for the conveyance of passengers on the Ardrossan Canal, for nearly two years, has been *from nine to ten miles an hour; and although there are fourteen journeys along the canal per day at this rapid speed, its banks have sustained no injury.*"

The cost per mile for the Canadian canals has been much greater than in this country, but the outlay has been made with better judgment. What we now want is, not more miles of canal, but a greater capacity in those we now have. The cost per mile of canals in Canada has been $155,300, and in New-York $24,150, showing that we can yet get the same advantages without a greater cost than has been made in Canada.

The use of steam as a propelling power on canals is not a new idea; it has, in fact, been used more or less for nearly thirty years; but genius has now developed plans whereby the moving power shall occupy only a small space near the stern of the vessel, and thus the main objection to the use of steam is removed.

In the last number of the *Journal of the Franklin Institute* an historical account is given of the progress of steam navigation on the British canals, from which we gather the following facts:

In Great Britain and Ireland the total length of canal and inland navigation is about 4,000 miles; and it is estimated there has been expended in the construction and improvement thereof AT LEAST £50,000,000 sterling. These figures of themselves sufficiently demonstrate the importance, in a national point of view, of this great interest.

The first attempt to move a vessel by steam on the Forth and Clyde Canal was made about the beginning of the present century, and it appears that a Mr. Simington was connected with the fitting up of the boat. This boat was propelled by two paddle-wheels close together at the stern, with the driving cranks between them. It ran for some little time; but its chief merit was considered to lie in its being an ice-breaker, for which it answered admirably. Although the records of the canal do not mention the fact, there can be little doubt that this was the *Charlotte Dundas*, constructed by Symington in 1802, and with which he made one of his first essays in steam navigation.

In 1828 the *Cyclops*, a boat for carrying passengers, was fitted up as a steamer with paddle-wheels at the stern. She was 64 feet long, 16 feet broad and 6 feet deep; carried about 40 tons of goods, and went about 3½ miles per hour on the canal, and about 6 miles on the Firth of Forth.

In 1831 the *Manchester* steamer was built, propelled likewise by one wheel at the stern. She carried from 50 to 60 tons of goods, and steamed about 4½ miles on the canal, and 7 miles on the Firth.

The *Lord Dundas* was also built in 1831 as a passenger boat. She had two paddle-wheels, one on each side of the stern, and steamed about 7½ miles an hour on the canal. All these boats ceased to be used on account of the costs of working being greater than horse-haulage, and from constant failures in the machinery.

It was proposed at one time, and actually tried, to haul vessels on the canal by laying a chain along the bottom, to be acted upon by a pulley in the boat—the pulley being worked either by hand or steam power. Another experiment was the laying down a line of railway on the towing path, on which a locomotive engine ran and hauled boats behind her; a previous trial for hauling them by a locomotive for common roads running on the towing path having signally failed, as might reasonably have been expected.

In 1844 a Mr. Kibble patented a paddle wheel, composed of a number of float-boards fastened on an endless chain, working round two

drums. It was thought that this mode of propulsion was well adapted for canals, and a boat fitted with a paddle of this description on each side was tried, but given up on account of the expense.

It cannot be denied, that since the introduction of railways, canals, which, prior to that event, formed the principal mode of conveyance for a very large proportion of the goods and mineral traffic of the country, have been thrown into the shade, and that the attention of practical men has been more devoted to the development of railway traffic, not only as regards the mechanical appliances for its transit, but also as regards the acquisition and carrying of large quantities of merchandise and minerals, than to the improvement of the more ancient mode of conveyance.

There is no good reason, however, why this should be so, for although in some cases canals may be the avowed rivals of railways, in others they are or might be made the means of feeding their traffic, or of relieving them of a portion of the heavy merchandise and mineral traffic which railways cannot always carry with advantage to themselves. It does not follow that because a railway may be carrying a large amount of tonnage it is doing so profitably; on the contrary, it is to be feared that in many cases, if the costs were fairly set against revenue, the result would be found quite the reverse, the rate obtained being inadequate to meet the greater wear and tear of the iron road, as compared with the water-way, and the many sources of expense to which railway plant is subjected. For passengers and for light and perishable goods, and for goods requiring quick despatch, canals never can or ought to compete with railways, but for bulky and heavy goods and minerals we believe that they can and will maintain their ground, provided their managers keep pace with the improvements and requirements of the day.

Objections were urged many years ago to the use of steam on canals, on the ground that increased speed would create increased abrasion of the canal banks, and thus effect permanent injury to the work. As far back as the year 1833, experiments were made through the Chesapeake and Delaware Canal, under the direction of Professor BACHE, which demonstrated then, to the satisfaction of the examiners, that this objection was not sound. In the 12th volume of the *Journal of the Franklin Institute*, (pp. 371, 372, year 1833,) we find the following results recorded:

"A review of these experiments leads me to the conclusion indicated in the commencement of this article, namely, that steam power may be substituted for the present method of towing by horses, on large canals, with great advantage to the canal, (banks,) particularly at high velocities.

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"In these experiments, at the highest rate of motion obtained, (7.64 miles per hour,) there was no swell produced in the straight parts of the canal which would have been likely to injure the banks, although not specially protected. The wave from the bow of the boat, owing to the peculiar form of that part, fell in with the wheels and was disposed of by them; while the lean form of the stern brought together the waves produced by the wheels, which, therefore, spread very little, if at all, in a lateral direction, that is, towards the banks, being directed towards the tow path only in parts of the curved portions of the canal."

Professor BACHE'S theory is, that by the increased motion produced by steam, the boat is thrown upon the wave, and that the abrasion of the canal would be less with a rapid than a slower speed. To this we may add that the more recent improvements in the construction of vessels, (particularly propellers,) and the adoption of improved engines which occupy a small space only, the adaptation of canals for transport of goods at a fair rate of speed is fully established. This rate, which was set down at 7.64 miles per hour in 1833, may be safely guaranteed now at eight miles per hour.

This statement may occasion some surprise on the part of those who urge that a period of twenty-five years should have more readily developed this result. We can account for this want of earlier development only in the fact, that about the time these early experiments were made on the Chesapeake and Delaware Canal, the superior speed of rail-road communication had just been shown; and the extraordinary changes produced in the commercial world during the years 1832–1840, by this more rapid transit, seem to have shut canals out of view, among the public, as channels of trade.

Now, when we find that a steam engine of eighty-horse power, occupying less than thirty cubic feet near the stem, will propel a canal boat or other vessel, of four hundred tons, TEN OR ELEVEN MILES PER HOUR, leaving nearly the entire hold for storage purposes, it would seem that the capacity of canals to compete with rail-roads, in heavy freights, is clearly demonstrated.

We think the time is near at hand when the vast contents of western granaries, as well as western produce generally, will reach the Hudson and our city limits by vessels direct from Chicago, Milwaukie, Cleveland, Detroit and other ports. The improvements in steam power will secure the transmission of goods, &c., at low rates of freight, from Buffalo to New-York in four or five days, from Chicago and Sault St. Marie to New-York in ten or twelve days. No reasonable merchant will require a greater speed than this.